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THIS IS UNEVALUATED INFORMATION

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/Available is a photostatic copy of 1:350,000 scale map of the generating stations and transmission lines of Hungary dated 1939, upon which features commented upon in the text below./

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1. the capacities of the power plants in and around Budapest

The Kelenföld thermal plant on west bank of the Danube just outside the city limits of Budapest in Albert-Falva district is the most important plant in the metropolitan area. It has a capacity of 150 MVA. It was originally built in 1911 and has been enlarged several times. Kelenföld was destroyed during World War II but had been put back into normal operation in 1947.

The Revesz thermal plant, located in the north central part of Budapest, was originally part of the Budapest trolley system. It is now a part of the reserve system of the city having a capacity of 10 MVA. It is the only plant in Budapest which was never out of operation during World War II.

The Phoebus thermal plant on the northern edge of Budapest was a private power company with a capacity of 10 MVA. It is tied in with the Hungarian electrical network.

There are also two small plants near the center of Budapest which have capacities of about 5 MVA. However, neither of these were in operation in 1947. They were technically supposed to be in such condition that they could be put into use on six months notice. Both were old and broken down.

The Banhida thermal plant, located at the village of Banhida to the west of Budapest, has a capacity of 100 MVA. It is located near the mines from which they obtain their coal supply.

The Lörinci thermal plant has a planned capacity of 150 MVA. Construction began in 1942, and one set of generating equipment -- boiler, turbine, generator -- of 50 MVA capacity was ready for use in June 1945. However, this was dismantled by the Soviets and shipped to the USSR. The plant was being rebuilt [redacted] /October 1947/ and was scheduled to go into operation in 1949. 50X1-HUM

The Csepel thermal plant was part of the Weiss Manfred Works. It is a 25-cycle plant with a capacity of around 30 MVA. The Weiss Manfred Works bought power from the municipal works to supplement its own production.

2. [redacted] concerning the proposed hydroelectric developments on the Tisza River [redacted] 50X1-HUM

[redacted] /October 1947/ all proposed hydroelectric construction was very much in an ethereal stage. No plans had been drawn up. Two plants, each of 50 MVA capacity, had been proposed for the Danube, and one of 50 MVA capacity was proposed for the Tisza to be constructed in the vicinity of Szeged. The proposed hydroelectric development was not being given serious consideration because:

a. Neither the Danube nor the Tisza would provide sufficient head to make an effective hydro installation.

b. Flood problems on both rivers are considerable.

c. Thermal plants would be more efficient in Hungary because of the abundant supply of coal.

[redacted] the Danube was a better place for hydroelectric plants than the Tisza.

3. [redacted] for power generating equipment is manufactured locally [redacted]

Nearly 100 per cent. Up to 1945 almost all of the major components were manufactured in Hungary. There was some British equipment put into the Banhida plant but this is because some British funds were involved and it was called for in the contracts. Since 1945, [redacted] bought turbines for the Lörinci plant [redacted] Again this is not because of lack of producers in Hungary. This is because Hungary was forced by the Soviets to send its turbine output to Yugoslavia and the USSR. 50X1-HUM

4. [redacted] major suppliers of power generating equipment [redacted] 50X1-HUM

a. Boilers - By Dunagőzhajozasi, a Budapest ship building yard. Their production alone has been able to satisfy the boiler needs in Hungary. [redacted]

b. Turbines - All power generating turbines manufactured in Hungary are manufactured at the Lang Machine Works Budapest. In addition, Lang produces Diesel engines and steam engines. From 1945 to [redacted] /October 1947/ the entire production of this plant was being exported to Yugoslavia or to the USSR. They employed about four or five thousand workers. 50X1-HUM

c. Generators - The only supplier of generators in Hungary was the Ganz Electric Plant, Budapest. They manufacture generators up to 50 MVA capacity, and were capable of supplying the complete needs of the country. In addition, Ganz manufactured all the transformers and circuit-breakers used in the Hungarian power industry. Ganz was completely destroyed during World War II, but was well on the way to being rebuilt [redacted] they are now producing as much or more than they did in 1938 and 1939. Ganz employs about 10 thousand men. They manufacture only heavy industrial electrical equipment -- not household fixtures and radio components.

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5. the principal "bottlenecks" in the electrical expansion program in Hungary

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As far as Hungary alone is concerned, she can completely supply herself with necessary material for an electrical expansion program. The principal places where difficulties might arise, however, are:

a. Insufficient copper - normally obtained from Yugoslavia.

b. Insufficient kaolin for use in manufacture of insulators. This has been supplied from Czechoslovakia.

c. Lightning arresters have normally been imported from Germany and Switzerland.

d. Small joints in overhead connections, clamps, aluminum and copper fittings. Because these items lend themselves to mass productions, Hungary has found it cheaper to buy them from a foreign producer than make the relatively small supply demanded by the electrical industry.

6. manufacturing or qualitative deficiency in Hungarian power equipment

deficiencies which are caused by insufficient supply of raw material. Many conductors are pure aluminum since it was the law from 1942 to 1945 to use aluminum instead of copper -- even in underground cables. Although the law has changed, aluminum is still used largely for conductors because of the inability to obtain copper. Boilers, transformers, turbines and generators are high grade.

7. the maximum length of A/C systems in the USSR or Satellite areas

The length of the A/C system is restricted to the country. There is no connection to the Slovakia area or the Carpatho-Ukraine areas which were formerly Hungarian. The Hungarians had a desire to build hydroelectric plants in the Carpatho-Ukraine area, and to connect them to Miskolc-Lőrinci-Budapest-Győr system. In 1947 this area was completely sealed off and no power connections remained.

8. D/C systems

D/C systems are very unimportant. There is no industrial area in Hungary which is supplied only with D/C. There is a small amount in Budapest, and some in rural areas. All of it is being gradually replaced with A/C. Where there are D/C systems, rotating converters were originally installed. These were replaced as necessary by mercury pool type rectifiers which are manufactured by Lumen in Budapest.

9. standards of operation achieved with protective circuit-breakers

On transmission systems distance relaying is applied. Clearing times are one-half second and upward. The highest interrupting capacity is about 1200 KVA.

10. voltages prevail in the Hungarian system

Main transmission lines are 110 and 66 KV. In Budapest all principal transmission lines are 110 KV or 30 KV. Distribution lines are 10 KV and 5 KV, and for home use the voltages are 110/190 3-phase or 220/380.

11. the Budapest-Lörinci line

It was built in about the location sketched on the power map in red. It has a voltage of 110 KV like the main transmission system across northern Hungary.

12. the status of the line from Lörinci to Miskolc 50X1-HUM

It was in an advance stage of planning It was to be a 110 KV line to fit into the national power grid.

13. other recent and proposed construction in the transmission system

Two major ideas were being set forth One proposal was to build a belt line around the country which would connect Győr, Nagykanizsa, Pécs, Baja-Szeged-Békés Csaba, Debrecen and Miskolc. /Indicated with blue line on map./ The second proposition was merely to connect the grid in northern Hungary with the Pécs region. /Indicated with yellow line on map./ Either system would be built to handle 110 KV doubt if either proposal has been carried out because the area to be served doesn't really need the power supply that would be furnished. 50X1-HUM

The line from Lörinci to Budapest is completed and has 110 KV capacity.
the line from Lörinci to Miskolc is completed. If so, it would be 110 KV the line from Miskolc to the Mesznoeten hydroelectric plant is completed and of 110 KV capacity. It is operated at only 20 KV The hydroplant was completed and has a capacity of 3 MVA. 50X1-HUM

most of the proposed rural electrification program such as shown on the map in the Pécs region has been completed

14. frequencies and degrees of frequency stability exist

Frequencies
Budapest - 50 cycle
Country - 42 cycle
Some industries - 25 cycle, such as Manfred Weiss.

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The frequency stability is much inferior to that It is good enough however to run synchronous clocks. The frequency is hand regulated.

15. the limiting technical and economic factors which would determine the type and specifications of long-distance power systems in use and being planned

Local industry has the ability to expand considerably. Regulating devices and relays would probably have to be bought outside of Hungary. Hungary could handle the expansion problem even if it were decided to increase the voltage to 150 KV.

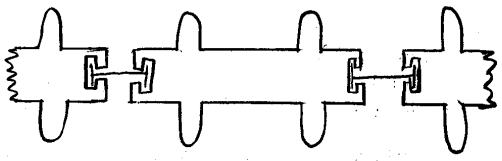
16. any radically new principles, methods, or devices being promoted

None

17. line materials and design conventional

The line from the Mésznoéten hydro-plant to Miskolc is of US design. It is a flat type 3-phase line with steel towers. All other 110 KV lines are double 3-phase lines with steel towers. In fact, wood support is not used for lines of voltage over 30 KV. All above this are supported with steel.

In recent years, most insulators have been replaced by those of the double cap variety /as illustrated/.



and single rod type.

The principal conducting material, as explained above, now being used is aluminum. It has even been used for underground cables and house installations. We have used ACSR (aluminum cable steel reinforced) and aluminum alloys without steel reinforcement. There is practically no copper in use. In 1947, the biggest share of conductors being produced were pure aluminum. [redacted] this is still true.

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18. [redacted] methods [redacted] used for lightning protection. [redacted] 50X1-HUM

Ground wires and lightning arresters.

19. [redacted] extent has system inter-connection progressed [redacted]

Inter-connection has been slow and is only across northwest and north central Hungary. Systems which are tied in are Banhida, Kelenföld, Lörinci, Phoebus, Györ Wagon Factory Electric Plant. The total capacity is slightly less than 500 MVA. Plans were under way to connect the Miskolc area into the system. [redacted] this has been done. [redacted] there is no other inter-system network in Hungary.

20. [redacted] means of basic frequency control [redacted]

There was no telephony control. It is handled by one of the big stations in the system.

21. [redacted] the proportion of outdoor to indoor substations. [redacted]

I can speak best for Budapest. Here there are two 100 KV substations which are both outdoors. All the rest are indoors.

22. [redacted] electronic supervisory control being used in power work [redacted]

In October 1947, none was being used or planned.

23. [redacted] automatic substation controls, telephony and telemetering used in Hungary [redacted]

[redacted] not much. Carrier current relaying and telephony are used on the new Lörinci line. There is very limited substation control. The new (1947) 25 MVA substation in Budapest, called the Soroksari-ut (street) station has standard automatic substation control. It was the only such station in Budapest in October 1947.

- end -

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MAGYARORSZÁG

VILLAMOS ENERGIATERMELŐ TELEPEI ÉS NAGYFESZÜLTSÉGŰ TÁVOLSÁGI VEZETÉKEI

AZ 1939. ÉVI AUGUSZTUS HÓ 1-i ÁLLAPOT

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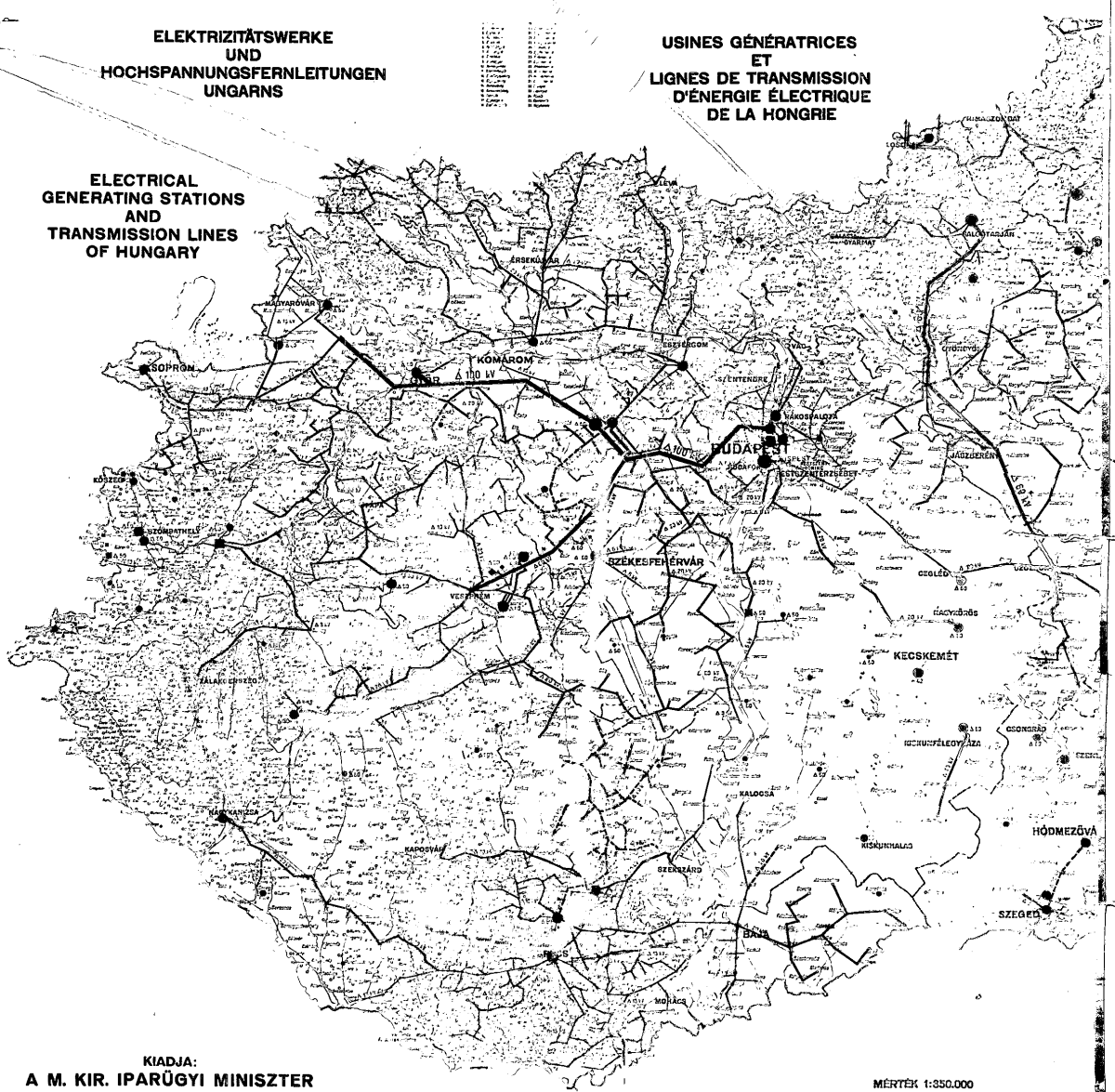
ELEKTRIZITÄTSWERKE UND HOCHSPANNUNGSFERNLEITUNGEN UNGARNS

USINES GÉNÉRATRICES ET LIGNES DE TRANSMISSION D'ÉNERGIE ÉLECTRIQUE DE LA HONGRIE

ELECTRICAL GENERATING STATIONS AND TRANSMISSION LINES OF HUNGARY



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